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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,756	06/27/2003	Hiromichi Ota	239657US2	5542

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EXAMINER

SOUW, BERNARD E

ART UNIT	PAPER NUMBER
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2881

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/606,756

Applicant(s)

OTA ET AL.

Examiner

Bernard E Souw

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-13 is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-9 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Specification*

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

3. The disclosure is objected to because of the following informalities:

- ▶ On page 26, line 1 of the 1<sup>st</sup> full paragraph, the wording "*the length Dw ...*" should better read "*the width Dw ...*".
- ▶ On page 27, line 4 of the 1<sup>st</sup> first full paragraph, the wording "*spacer member 25*" should better read "*spacer member 25 c*".
- ▶ On page 27, line 2 of the 2<sup>nd</sup> full paragraph, the wording "*spacer members 25b*" should better read "*spacer members 25 c*".
- ▶ On page 28, line 1 of the 1<sup>st</sup> first full paragraph, the wording "*spacer members 25b*" should better read "*spacer members 25 c*".

Appropriate corrections are required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites in lines 13 and 15 the word "*almost*" that renders the claim indefinite because it does not clearly set forth the metes and bounds of the patent protection desired.

Claim 6 also recites the phrase "*laser emitting parts divided from other laser emitting parts ..*" in line 21. The word "divided" is not understandable to one of ordinary skill in the art for being used not in its generally accepted meaning.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Williamson et al. (USPAT 5,930,433) in view of Xu et al. (USPAT 6,306,563).

Williamson et al. disclose in Fig.1, 13, 14 and 16 a laminated optical waveguide array 18 comprising a plurality of plate-like optical waveguides made of a material having a predetermined refractive index, as recited in Col.3/ll.31-37, Col.4/line 67 + Col.5/ll.1-14.

However, Williamson et al. do not expressly teach the use of spacer members having a lower refractive index arranged alternately with the optical waveguides. Interpreted in the light of Applicant's specification, Applicant spacer members are part of Applicant's waveguide cladding. Therefore, one of ordinary skill in the art would understand that the refractive index of these spacer members must satisfy the general criterion for waveguide claddings.

Xu et al. disclose a planar waveguide comprising core and cladding made of photopolymer compositions, as recited in Col.13/ll.3-10, more specifically photopolymerizable compounds, as recited in Col.14/ll.51-52. Xu's polymerizable compound used for cladding has a lower refractive index than that of the core, as recited in Col.18/ll.49-58. This polymerizable compound is synthesized by liquid casting by using appropriate spacers, as specifically recited by Xu et al. in Col.25/ll.38-42.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use spacer members having a lower refractive index arranged alternately with the optical waveguides, since this spacers are part of the cladding, as understood by one of ordinary skill in the art from Applicant's specification.

► Regarding claim 2, Williamson as modified by Xu et al. discloses the claimed invention except for cylinders, spheres and plates being used as spacer members. Xu's

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spacer members specifically recited in Col.25/ll.38-42 are unspecified, but unambiguously characterized as being "*appropriate*" spacer members. Since applicant has not disclosed that any of the recited forms, i.e., cylinders, spheres and plates, solves any stated problem or has any particular purpose, Xu's unspecified but *appropriate* spacer members inherently includes Applicant's specific forms.

► Regarding claim 3, in the process of liquid casting of the waveguide cladding, Xu's vacancy between spacer members is filled with resin, i.e., a polymerizable compound, having a refractive index lower than that of the waveguide material, as recited in Col.25/ll.38-42.

6. Claim 3 is also rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson et al. in view of Xu et al., as previously applied to claims 1 and 2, and further in view of Ishikawa (USPAT 5,061,029).

Specifically, Ishikawa describes an optical waveguide as shown in Fig.1(D) and 1(E). Ishikawa's spacer (members) 3a and filler 5a is made of resin having a refractive index lower than that of the waveguide material to serve as cladding, as recited in Col.2/ll.45-68.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson et al. in view of Xu et al., as previously applied to claims 1 and 2, and further in view of Robbins (USPAT 3,688,159).

Williamson et al. as modified by Xu et al. et al. show all the limitations of claims 4 and 5, as previously applied to the parent claims 1 and 2, except the recitation of a securing member for pressurizing the laminated waveguides to secure the entirety of the stack (claim 4) and a buffer member(s) having smaller refractive index between the opposite ends of the laminated waveguides and the securing members (claim 5).

As a matter of fact, to secure by pressure a stack of plates in order to secure the entirety of the stack is conventional, and can be derived from general knowledge in the art even without being taught by any prior art. However, prior arts are plenty, as recited by the two references below.

Robbins shows in Fig.2 two stacks of plates 2 and 4 which are secured by spring assembly 14, as recited in Col.4/ll.1-26 for pressurizing the stack, as recited in lines 18-26, the securing device further includes a buffer member 32 also shown in Fig.2, as recited in Col.10/ll.34-36.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to secure the waveguide stack of Williamson as modified by Xu using a pressurized device that secures the entirety of the stack as taught by Robbins, including a buffer member that eliminates the requirement for use of shims, as recited by Robbins in Col.10/ll.34-40.

8. Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beach et al. (USPAT 5,307,430) in view of Ventrudo (USPAT 6,240,119)

Beach et al. disclose a beam collecting device shown in Fig.1-3, comprising an optical waveguide 10 for collecting a beam entered into an incidence surface 11 to a

predetermined position in a predetermined direction (i.e., to the right in Fig.1), and for emitting the beam from an emission surface 12 in a direction to the right.

Although Beach's device does not specifically recite an optical fiber, the laser rod 33 depicted in Fig.3 may as well comprise, or substituted by, a state-of-the-art fiber laser, as shown by Ventrudo in Fig.1 with the first lens 22 of the optical system 20, which has a collimating property, replaced by Beach's beam collecting device. Thus, Beach as modified by Ventrudo effectively use a refraction means, i.e., Ventrudo's lens 24 provided between Beach's optical waveguide (replacing Ventrudo's first lens 22) and Ventrudo's fiber laser 31 for diminishing the angle at the incident surface of the fiber laser 31 in comparison with the angle before being refracted at the emission surface of Beach's optical waveguide beam collimator device.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Beach's beam collecting device to pump a fiber laser with a diode laser as taught by Ventrudo, since the unsymmetrical (i.e., vertical and horizontal) acceptance angles of Beach's device match the unsymmetrical laser beam divergence of a pump laser diode along the fast and slow axes, resulting in a collimated beam output that is further focused by Ventrudo's second lens 24 into the fiber laser 31.

► Regarding claim 9, Beach's device as modified by Ventrudo has an incidence surface located outside, or at the border of, the optical waveguide, whereas Ventrudo's refraction means 24 inherently comprises a curved surface for being a lens. It is further well known in the art that the curved surface of Ventrudo's lens 24 is conventionally determined by the position and the refractive index of Beach's optical waveguide, since



the latter determines the focal length of the lens that is to be designed according to properties of the waveguide, including its refractive index, and the geometry of the optical arrangement in the overall device, that includes positions of the respective elements.

***Allowable Subject Matter***

9. Claim 6 (insofar the examiner can ascertain beyond the §112/¶.2 rejection) and claim 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Reasons for Allowance***

10. Claims 10-13 (and also claim 6, insofar the examiner can ascertain beyond the §112/¶.2 rejection) are allowed for the invention of a laser emission device based on laser diode array that is known to have strongly different solid angles of emission, known in the art as fast and slow axis, using laminated optical waveguides that simultaneously match the different cone angles of emission along the fast and slow axes by putting the waveguide plates at an interval that accommodates the slow axis emission angle, while accommodating the fast axis emission angle with the refractive curvature of the input surface of the planar waveguides, so as to achieve at the output or emission surface of the laminated waveguide array a laser beam array having a low and more uniform divergence that is efficiently passed through a optical fiber bundle for

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convenient and much less problematic transfer to the end receiver or other optical device(s).

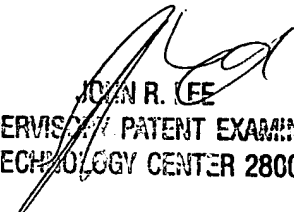
### ***Communications***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw whose telephone number is 571 272 2482. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 571 272 2477. The central fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for regular communications as well as for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

bes  
March 05, 2004

  
JOHN R. LEE  
SUPERVISOR / PATENT EXAMINER  
TECHNOLOGY CENTER 2800